JPRS 76501

25 September 1980

West Europe Report

SCIENCE AND TECHNOLOGY

No. 33

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WEST EUROPE REPORT

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CHEMICALS

NEW ALCOHOL-NITRATION TECHNIQUE DEVELOPED

Stockholm NY TEKNIK in Swedish 26 Jun 80 p 3

[Article by Ulf Bergmark: "New Ethyl Alcohol Fuel"]

[Text] Nitrated alcohol may be the future fuel for diesel-propelled busses and trucks. Bofors Nobel Kemi has produced a new and very cheap nitration technique which they are going to introduce on the world market together with Saab-Scania. The country which is closest to being ready for the large-scale introduction of such a fuel is Brazil, which now is concentrating on a rapid conversion to ethyl alcohol propulsion.

Nitration of alcohols, ethyl alcohol and methanol, is a method of increasing the ignition quality of a fuel. A high ingition quality is necessary for the self-ignition of a fuel in a diesel engine to be possible. Unnitrated alcohol has a very low ignition quality, and therefore it is not suitable for a diesel fuel.

Nitration experiments with ethyl alcohol and methanol are going on both in the United States and Brazil, as well as in other countries. What is new about the Bofors process is the fact that it is said to be much cheaper than methods used previously. Initial investment costs are also lower. Up until now, the production of nitrate esters has taken place on the laboratory scale. During the fall, a pilot plant will be built at Bofors where a number of nitrate processes can be tested. One can produce 2-ethyl hexanol, which has shown itself to be most suitable for the Brazilian market, from ethyl alcohol. Other nitrates can be used in countries with different conditions.

In order to obtain sufficient ignition quality, 12 percent of 2-ethyl hexanol in the ethyl alcohol is enough. Up until now, 95-percent ethyl alcohol has been used. In the coming experiments, they will possibly test on down to 80-percent ethyl alcohol mixed with 2-ethyl hexanol.

Saab-Scania's diesel engine laboratory in Sodertalje is testing the new fuel. It is said that the fuel functions extremely well. The only change which has to be made in the engine itself is that a conversion of the diesel pump has to be carried out, since alcohol has a lower energy density than diesel oil.

The result is that 70 percent more fuel is required to obtain the same amount of power if one operates with alcohol. Up until the persent, exhaust gases from the new fuel have proved to be cleaner than diesel exhaust gases. Principally the smoke content, but also the nitrous oxide content, are reduced--the latter because of a lower combustion temperature. In exhaust gas analyses, they have chiefly encountered residues of unconsumed ethyl alcohol. The analyses are not yet completed.

Together with Saab-Scania, Bofors wants to study distribution questions, corrosion questions, the effect of lubricating oil, etc.

The new fuel is going to be introduced first in Brazil, which has a very ambitious ethyl alcohol program. Brazil is already mixing up to 20 percent of ethyl alcohol with gasoline now.

Saab-Scania, which has 40 percent of the market for heavy vehicles in Brazil, will play a large part in the project. Saab-Scania is also doing research in regard to passenger cars driven by methanol.

What is slowing down the introduction of ethyl alcohol is the fact that the production of ethyl alcohol by the traditional processes is expensive. Bofors Nobel Kemi wants to cooperate with Swedish enterprises which can come up with a cheaper process. Such a process has been brought out by Alfa-Laval. However, no contact has been made between these enterprises.

"We ought to be willing to introduce an entire package which would be Swedish from the production of ethyl alcohol to the vehicle which has been adapted to the use of it," says Olle Jangemyr, a project chief at Bofors.

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CSO: 3102

NEW COAL-BASED FUEL TESTED

Stockholm NY TEKNIK in Swedish 10 Jul 80 p 4

[Article by Lennart Bernhardtson: "Coal Jelly Now Being Tested in Kvarntorp"]

[Text] In the middle of June, Supra carried out the first practical experiments with so-called "carbogel," a jellylike mixture of pulverized coal and water, in Kvarntorp. Oil is completely replaced by "carbogel" for 2 hours during the production of ammonia. In the fall, Supra will continue its experiments on a larger scale.

As a rule, Supra uses gasified oil as a raw material in the production of ammonia. Hydrogen gas is extracted from the oil and is synthesized with nitrogen from the air to ammonia. In the experiments which were carried out in June, "carbogel" was mixed with the oil. The amount mixed in was increased from one experiment to another, and they ended up with 2 hours of operation exclusively on "carbogel," and that was accomplished without any serious problems.

Coal-Based Fuel

But the big area where "carbogel" can be used is the field of coal-based fuels. That is a mixture of pulverized coal and water which gets a jellylike consistency through the addition of an organic material.

In spite of the fact that 30 percent of the mixture consists of water, its loss of efficiency is only marginal. The "carbogel" gets a consistency which is the approximate equivalent of that of crude oil, which can be transported and stored in ordinary tankers, pumps, cisterns, and the like. It can be burned immediately, without drying. "We also expect 'carbogel' to be a cheaper fuel than oil," says Nils Lagerholm, who is a member of the group forming the management of the newly-formed AB Carbogel. "But I will not venture to say anything about how much cheaper it will be."

Beneficial to the Environment

The really great advantage of "carbogel"--and one which can make it an article with a worldwide market--is the fact that it is beneficial to the environment. Most of the impurities, such as ash, gravel, heavy metals and

sulfur, are removed when the coal is ground. The worst qualities of coal can be used to produce the new fuel.

"Carbogel" was developed by an enterprise in Helsinki called Scaniainventor. Scaniainventor and Bolden recently combined together as co-owners of AB Carbogel, with each owning half of it.

Boliden expects to be able to make use of the new fuel in most of its manufacturing operations, including the manufacturing of ammonia in its subsidiary, Supra. In Boliden Kemi, "carbogel' provides an additional raw material in the form of sulfur, and in Boliden Mineral, they are interested in getting into the expanding field of coal production.

9266
CSO: 3102

ENERGY

WESTERN WORLD EXPENDITURES FOR ENERGY RESEARCH ANALYZED

Frankfurt/Main FRANKFURTER ALLGEMEINE BLICK DURCH DIE WIRTSCHAFT in German 5 Aug 80 pp 1, 5

[Article by Dr Werner Gries: "DM 22 Billion in 1 Year"]

[Text] Frankfurt, 4 August--In 1979, about DM 22 billion was expended from government and private funds in the Western World for the field of energy research. This figure is a composite from data of the international energy agencies and the EEC commission for government expenditures and for those of business in the Western industrial countries. One should also take note that such funding information is associated with enormous margins of error, both as a result of data collection as well as defining the notion of "energy research outlays." Despite this, renewed efforts have been undertaken, especially since the oil crisis in 1973, to characterize expenditures by individual economies for the development of new energy sources by using a number of indicators. An obvious indicator is offered by the collecting of data which provides at least an estimate of the economic resources which each country and the Western World as a whole has at its disposal for the field of energy.

Below a survey is provided based upon the most recent international studies. This data relies heavily upon the recent publication by the International Energy Agency. The disadvantage of this data consists mainly in the fact that France is not included as one of the most important Western industrial countries because it is not a member of the International Energy Agency. For this reason, the data for France was composed from other documents and was estimated for the year 1979 on the basis of previous figures and of the research financing structure in France. The government expenditures for energy research are still the easiest to estimate because they are relatively accessible from the budget proposals of the individual countries.

In Table 1, the government expenditures of Western industrial countries for energy research are provided for 1979.

Table 1. Government Expenditures of Western Industrial Countries for Energy Research in Billions of U.S. Dollars for 1979*:

Country Area:	Total	Nuclear	Regenerative	Other
1. United States	3,783	1,628	624.2	1,531.0
2. Japan	919	774	38.5	106.5
3. FR Germany	1,048	678	46.4	323.6
4. Great Britain	389	251	19.1	118.9
5. France**	995	498	78	419.0
6. Italy	213	185	13.5	14.5
7. Switzerland	53	32	8.8	12.2
8. Holland	112	62	10.0	40.0
9. Sweden	107	19	32.0	56.0
10. Other OECD	435	242	56.6	136.0
11. All countries	8,054	4,369	927.1	2,757.7

*Source: International Energy Agency, Energy Research Development and Demonstration in the IEA Countries 1979 Review, Paris, 1980

** For France as a nonmember of the IEA, estimated from EC documents.

Government expenditures for energy research in the Western World, and this can be maintained in light of the countries listed, constituted about $8 billion in 1979. Broken down in separate areas by percentage of expenditure, they constituted:

--54.2 for nuclear research and nuclear technology;
--11.6 for research on regenerative energy sources (solar, wind, ocean, biomass);
--34.4 for coal, gas, oil, research, energy conservation, storage and other.

Of all the government outlays for energy research, 88.5 percent was spent by 5 countries: the United States, Japan, the FRG, Great Britain and France, and of these the United States alone expended 47 percent of the total amount. The proportion of funds of the countries for nuclear research and nuclear technology to the total government expenditure for energy research is very different among the Western countries. If one views the ratio of government expenditures for nuclear research and nuclear technology to total government outlays for energy research, then based upon the data in Table 1, the individual countries spent the following (in percent):

--Japan, 84.2;
--FRG, 64.7;
--Great Britain, 64.5;
--France, 50.0;
--United States, 43.0.

The consequence to be drawn from this is that when compared internationally, the FRG expends excessively for nuclear energy but this would be a false conclusion because the research financing structure in the individual countries is very different. This is associated with the organizational structure and also the different types of financing of civilian and military research and development in the Western industrial countries. For this reason, one must at least view the entire picture of government and business expenditures in order to estimate roughly the funds spent for energy research. The International Energy Agency fortunately also estimated the energy research expenditures in the industrial sector. If one uses this data, then the following expenditures result for the Western industrial countries in the field of energy research:

Table 2. Expenditures of the Government and Business of Western Industrial Countries for Energy Research in 1979 in Millions of U.S. Dollars*

Country	Government (1)	Business (2)	Total (3)
1. United States	3,783	1,309	5,092
2. Japan	919	513	1,432
3. FR Germany	1,048	329	1,377
4. Great Britain	389	267	656
5. France**	995	155	1,150
6. Italy	213	124	337
7. Switzerland	53	192	245
8. Holland	112	109	221
9. Sweden	107	30***	137
10. Other OECD	435	85***	520
11. All countries included	8,054	3,113	11,167

*Source: International Energy Agency, Energy Research Development and Demonstration in the IEA Countries 1979 Review, Paris 1980.

** For France, estimated on the basis of the previous figures concerning the research financing in France

*** Own estimated values

Differentiating the energy research expenditures for business for individual areas was only performed for some countries. It will also be difficult to collect this data rationally because such types of published budget plans do not exist in industry as they do in the government field. The expenditures composited in Table 2 for the government and business in Western industrial countries include the estimated values of the International Energy Agency and our own based on other documents. The total

expenditure of business and government in the Western industrial countries was about $11.2 billion in 1979 for the field of energy research. Thus, one should consider that this is an estimated figure but it also represents the size of the outlays for energy research. The differences in the financing of the energy research sector by business and government is also characteristic. These differences are particularly noticeable if one identifies the proportion of energy research expenditures by business to the total energy research expenditures listed in Table 2 (in percent). The following percentages result (column 2 of Table 2 divided by column 3 of Table 2):

--FRG, 23.8;
--United States, 25.7;
--Japan, 35.8;
--Great Britain, 40.7;
--Italy, 36.7;
--Switzerland, 78.4;
--Holland, 49.3.

In the smaller Western industrial countries, such as Switzerland and Holland, traditionally the portion of business in research expenditures is relatively high. For this reason, a comparison of the purely government research expenditures leads to distorted conclusions. Especially in the case of Switzerland, where considerable funds are expended by business for energy research, in a comparison of government outlays, the country appears low on the list but in a total economic comparison, it occupies one of the top positions. This mean value for business' own inputs into energy research expenditures could give the impression that on the average the portion of German business outlays (24 percent compared internationally) is not very high. This business participation rate results particularly from the fact that the area of nuclear research dominates energy research both in Japan and the FRG. But because nuclear research is primarily financed by the state, there results a relatively lower business proportion of the total of energy research expenditures. This relation becomes very clear if one, for example, compares the financing of energy research expenditures according to areas in the United States, Japan and the FRG. The analysis shows:

The proportion of American companies of the all American outlays for nuclear research and nuclear technology is 6 0 percent in comparison with 10.6 percent in the FRG and 17.2 percent in Japan.

The proportion of American companies in the research of regenerative energy sources is 3.4 percent, with reference to expenditures, in comparison with 41.3 percent in the FRG and 44.0 percent in Japan.

The other mean value for business financing in the field of energy research primarily results from the fact that in the United States the

business proportion of the very high expenditures in the field of coal, oil and gas research is very high in comparison with the FRG and Japan. In the decisive fields of nuclear energy and regenerative energy sources, however, American business is practically totally financed by the government and very clearly so in the new market of regenerative energy sources.

It is very difficult to evaluate by objective criteria whether the energy research efforts of the Western World are sufficient or insufficient. The International Energy Agency, by means of comparing various statistical values, tries to arrive at objective standards in order to ascertain whether the energy research efforts of one country are sufficient when measured against total energy research expenditures. For example, if one takes the ratio of the government energy research expenditures in 1979 as a proportion of the gross national product, then the calculations of the International Energy Agency show the United States, FRG and Sweden at the top of the list. But, as the International Energy Agency also does, if one takes the ratio of the government energy research outlays as a proportion of primary energy use, then the FRG is at the top of the list followed by Japan and Switzerland whereas the United States appears further down the list. If one takes the ratio of government energy research expenditures per capita as a standard, then the United States leads the group, followed by the FRG and Sweden. So one can construct various indicators with the objective of providing positive arguments for each individual country in the field of energy research. But earlier on it was already stressed that an isolated look at the government sector--as usually occurs in the case of official statistics--leads to the wrong conclusions. For example, special considerations should be given to the notably high proportion of business in researching regenerative energy sources in the FRG and Japan in comparison to the United States when drawing conclusions on the expenditures for regenerative energy sources. This does not occur in the official papers because the business sector is not included there. For this reason, these indicators, appearing again and again in international documents, are hardly reliable. The example of Switzerland with a business proportion of 78.4 percent of the total energy research expenditures per capita must naturally lead to a poor position for Switzerland in international statistics, whereas if the total economic data is considered, Switzerland occupies a leading position. For this reason, even the data provided by the FRG government on the ratio of nonnuclear to nuclear energy research within the government's research promotion program is not very reliable. A random selection of these indicators--as occurs repeatedly in official documents--only leads to confusion and not toward a clarification of the connections. Especially for German business, one can say the following about energy research:

--in the field of researching regenerative energy sources, German business provides a very high proportion when compared internationally;

--in comparison with American industry, German business is proportionally twice as high as the Americans for nuclear research;

--in all, energy research expenditures of government and business in the FRG lead all other Western industrial countries.

It still has to be examined in detail whether the expenditures of the Western industrial countries for energy research are sufficient. If one views the energy research expenditures of the Western World in comparison with total military research expenditures, then the $11 billion for energy research expenditures in the Western World in 1979 constituted about a maximum of 40 percent of the military research expenditures. The Western World gives out about two to three times more for military research and development than for the entire field of energy research. If one then considers that military conflicts could occur in the future because of insufficient energy supplies, especially in the oil sector, then perhaps an increase in current energy research expenditures would do more to reduce tensions than would an increase in the research and development of military technology. But this too must be weighed in the total picture and primarily in the time dimension.

9327
CSO: 3102

GEOTHERMAL ENERGY PROSPECTS ASSESSED

Hamburg DER SPIEGEL in German 11 Aug 80 pp 38-39

[Unattributed article: "Out of the Substratum"]

[Text] A new energy source could soon bubble forth: Dwellings soon to be heated with hot ground water

Whenever the Bavarians drilled for oil in the depths of their Free State, for the most part only hot water came bubbling out.

That was also the experience of the Bavarian Mineral Oil Industry AG when, in 1937-1938, it was looking in the triangle between the Danube and Inn Rivers near Puessing for the raw material important to the war. Even the oil sultis which explored for energy reserves after the war in Endorf near the Chiemsee, for example, again hit only water; at best some natural gas also came hissing out of the drill hole.

Each time the oil hunters packed up their drill rods in disappointment. Only a few rural Bavarian villages were satisfied. From then on they were in a position to embellish their name with a touristy "Bad" [spa], and they promised healing for all kinds of civilization's infirmities using the newly tapped thermal springs.

Now it seems as if the most recent affliction of industrialized peoples could also be alleviated with the healing water: the energy crisis.

In the opinion of many geologists, the Bavarians' hot water is almost as valuable as the oil of the Sheiks. Deep springs could feed heating plants and possibly even generate power.

And there has been enough hot water in the Free State for a long time. Some 135 million years ago a karstic lime stratum, the Malm, formed between the Danube and the edge of the Alps; under the pressure of the developing Alps, this stratum later settled in a southerly direction to a depth of about 5,000 meters.

The deep ground water which collects in the fissures of the Malm is heated by the natural heat of the earth. The deeper the inclined plane of the Malm stratum declines toward the edge of the Alps, the higher the temperature of the subterranean water.

Underneath Munich, for example, at a depth of 2,000-3,000 meters, the temperature is already 85 degrees, and extending on to the mountains the temperature can rise to between 130 and 150 degrees.

There are also similar layers of hot water in Hungary and France, where for decades dwellings have been heated with geothermal heat.

In Budapest, 6,000 dwellings are hooked up to district heating plants which heat their hot water from hot springs. According to the plan, an additional 80,000 dwellings are to be added by 1985. In the environs of Paris, too, for example in Melun and Creil, several thousand apartments are using energy from under ground.

Last week the state-controlled French mineral oil company Elf-Aquitaine completed a drilling near Cronenbourg in the vicinity of Strasbourg. Soon 5,000 dwellings will be heated with the 140-degree hot water from a depth of 3,220 meters.

In the FRG, so far only a few people have been able to warm to the alternative heat source. Only in Buehl in Baden, at the end of last year by order of the Ministry for Research, was a test bore sunk in order to test the usability of the deep water for heating.

The big edge-fault of the Black Forest, like the south Bavarian Malm, provides good prerequisites for hot water-bearing layers. At a depth of 3,325 meters, the drilling crew of the German Shaft-Building and Deep-Boring Company from Lingen was also successful. The 100-degree hot spring is now going to be tested for its potential in the next few weeks.

The Bavarians are not in such a hurry. At the end of last year the Munich City Council, at the request of FDP Councillor Max Ludwig Fensold, decided to have the technical details of a test bore checked. Yet the experts from the Munich city works who are responsible for district heating were skeptical from the start: "Compared with fossil energy sources, the economic advantages today are not yet clear."

Rather than wait for the result of a study ordered by the Bavarian Ministry for Economics, which is to be completed at the end of August, the city works are speeding up the construction of a coal-heated district thermal power plant in the vicinity of the Olympic grounds.

The estimates of profitability by the Munich city works people are disputed by other experts. Even the energy conglomerate Preussag, which is exploring for coal, now deems it worthwhile to tap the earth's heat.

Preussag engineer Peter Ernst confirmed in a study that "the use of hot water deposits in the FRG" is "economically and technically realizable."

Munich geologist Peter Udluft of the Technical University also calculated annual energy cost savings of DM 1.3 million for a hot water drilling with 2.7 MW output, given a heating oil price of just 30 pfennig (current price is about 55 pfennig).

Of course, the domestic hot water reserves will not make the Germans independent of the whims of an ayatollah. Kurt Bauer, professor of geology at Freiburg, estimates that at most 3 percent of all West German energy consumption can be replaced by geothermal drillings.

Yet that, too, is substantial when compared to other alternative energy sources such as the sun and wind. According to cautious calculation by Preussag, the potential of hot water corresponds to the calorific value of 100 million tons of petroleum.

And in contrast to the exhaustible energy from oil or coal, hot water from the depths is inexhaustible: Either the water that has been tapped is replaced by new ground water, or the water, after releasing its heat, is channeled back into the depths via a second line where it heats up again by itself.

Large consumers, such as Munich's monstrous Grosshadern Clinic, now are declaring "special interest" in the deep water. The Siemens electrical conglomerate and Hipp's baby food factory also sought the advice of geologist Udluft as to whether they could tap the subterranean heat reservoirs in order to heat planned factory and office complexes, because such large consumers could possibly profit from having their own drilling.

If the springs bubble very hot, power can even be obtained from them. In the Munich development center of the Linde AG, the engineers discovered a method of operating a power plant with 150-degree hot water.

In this process the water heats propane gas. The propane expands from the heating and drives a turbine. At the same time, hot water for district heat can also be produced in the process.

The geothermal thermal power plant overcomes one disadvantage which to date has reduced the economy of using deep water: Energy from the earth also returns a money yield in the summer, too, thus at a time when heat for heating cannot be sold.

In view of such prospects, FDP member Fassold's heart is warmed: "Now we can finally show the Greens that we, too, are doing something for environmental protection."

12124
CSO: 3102

ENERGY

FULL-SCALE WAVE-POWER STUDIES UNDER WAY

Stockholm SVENSKA DAGBLADET in Swedish 25 Jul 80 p 5

[Article by Ulf Gustavsson: "The Most Serious Attempt Up To the Present; New Wave-Power Plant Tested in Goteborg"]

[Text] Goteborg--A new type of wave powerplant is going to be tested in the water directly off Goteborg in a few weeks. "This is the most serious attempt to set up such a plant up to the present," says Lennart Claesson, of Technocean in Goteborg, which has developed the experimental powerplant. The idea originally came from some inventors in Fagersta. Technocean in Goteborg was formed by bringing together members of the Chalmers group for wave-energy research. The firm now has designed a full-scale wave powerplant. The project is being financed by STU [Technical Development Administration].

"We tested the powerplant earlier, as a model, in Lake Lygnen. The tests produced very good results. Now we are putting out a full-scale prototype with Trubadur lights off Goteborg. The purpose of the experiment is to measure and record how the powerplant functions in the ocean environment and to achieve the production of power with a wave powerplant, over the somewhat longer term," says Lennart Claesson of Technocean.

The experimental powerplant consists, among other things, of a floating buoy three meters in diameter and three meters high and a plastic tube 20 meters long which is fastened to the buoy. The system weighs 6 tons as a unit. When the buoy bobs up and down on the ocean waves, the water slides backward and forward in the tube. That sets a plunger in motion which, in turn, drives a generator in the buoy. The entire system is held in place by three anchors. In conformity with hydrodynamic laws, the water in the tube gets to moving faster than the buoy bobs up and down. That has to do with the fact that the water lags behind the movements of the buoy all the time.

The system in its present design is expected to produce a power of about 10 kw. That is enough to provide for a few households.

Waves Do Not Cost Anything

The first experimental powerplant is of a size appropriate for summer waves, and not to produce maximum power. In the fall, there is more wind, and the wave powerplant can be larger than.

"The size of the powerplant is determined by the waves in which it is to operate. At Ringen, for example, the waves run higher than at Goteborg. A wave powerplant for the production of electricity for the commercial network requires approximately 100 buoys," says one of Technocean's employees.

One advantage of the system is the fact that one can easily assemble powerplants consisting of simple modules.

It will also be inexpensive when the wave powerplant becomes a reality. Waves do not cost anything. The only thing that costs anything is the maintenance of the components.

But up until now the wave powerplant has been a relatively expensive story. The test model in Goteborg has cost approximately 125,000 kroner.

When they are in series production, the cost can be reduced considerably by producing floating buoys of concrete instead of steel, among other things.

Many question marks remain in regard to the usefulness of wave power in actual practice. The ocean is a difficult environment to deal with. How will the wave powerplant make out in storms and when ice forms, and will corrosion and fouling impair its efficiency? The research workers hope to get answers to those questions now.

9266
CSO: 3102

HAUFF SUPPORTS MORE USE OF DISTRICT HEATING

Graefelfing ENERGIE in German May 80 pp 168-169

[Unattributed article: "Hauff Deplores Inadequate Share of District Heating in the Energy Supply"]

[Text] While breaking ground for the Lower Rhine district heating conductor on 28 April 1980, a project which is being supported by the Ministry for Research and Technology (BMFT) with a total of DM 108 million, Minister for Research Volker Hauff deplored what in his view is an inadequate share of district heating in the FRG's energy supply. In spite of existing proven technology, in spite of substantial support by the federal government and in spite of massive increases in the price of oil, which favor capital-intensive energy-saving investments, only insignificant progress has been made in the past 10 years in the use of waste heat in the district heating networks. To be sure, each year it was possible to expand the available district heating output by about 4 percent. But since the total demand for low-temperature heat increased at the same time, the share of district heating in the heat market has increased overall only insignificantly. Hauff pointed out the statement in the district heating study developed by order of the BMFT is in contrast with the actual share of about 7 percent of the district heating supply; according to this study, by 1990 it will be possible to count on an economically developable potential of about 25 percent of the total requirements for low-temperature heat.

Thus, Hauff called upon all those persons in positions of responsibility in the nation, Laender and committees and in industry to accelerate efforts which could increase the rate of expansion of the district heating supply. As examples of such measures Hauff mentioned the building of coal-fired thermal power plants of medium size which are located near the point of consumption and are environmentally safe; the establishment of local energy supply concepts which, given suitable prerequisites, did not balk at compulsory hookup and use; increased use of industrial waste heat.

It is precisely between the necessity to save energy, primarily mineral oil, and progress in the use of waste heat that Hauff sees a "glaring

incongruity." By order of the BMFT, therefore, a study is currently being made as to whether the instrument of waste heat release is suited to intensifying the use of waste heat.

Because of the considerable advantages of district heating energy--primarily the potential for oil savings equal to at least 20 million tons of hard coal units; less harm to the environment from the heat supply; substantial investment potential in the billions--the BMFT, according to Hauff, has spent substantial amounts for the continued development of district heating, more than DM 300 million in the past 5 years. In this connection Hauff expressed sharp criticism of the CDU Laender which, under the leadership of Minister-President Stoltenberg, are blocking the joint support of district heating expansion by the state and Laender, which is meaningful in terms of energy management. Hauff says: "Given the current situation in the world oil market, saving energy is not a suitable subject for the fiscal-policy disputes between the federal government and the Laender."

12124
CSO: 3102

MUNICIPALITY TO HAVE PEAT-FUELED DISTRICT HEATING

Stockholm NY TEKNIK in Swedish 10 Jul 80 p 3

[Text] In the fall of 1981, a peat-fueled district-heating furnace is to be put into operation in Skelleftea. The Ministry of Industry is suggesting that the government should contribute 7.5 million kroner in capital investment. The production of cut peat is to begin before the summer is over.

The furnace from Ahlstrom Oy which the Skelleftea Kraftverk will test is of a new design which is regarded as very suitable for heating with peat. It is a so-called rapid whirlpool bed rated at 7 MW.

The government's prototype and demonstration contribution amounts to half of the total amount of investment capital. The powerplant will not get any subsidies covering operation.

Before the summer is over, experimental production of cut peat will begin on a 100-hectare tract of peat 4 miles from Skelleftea. The powerplant has bought Finnish machinery which is connected behind agricultural tractors. When the furnace starts up in October 1981, a necessary supply of cut peat will have to exist.

9266
CSO: 3102

ROBOTS/PERIPHERALS: STATE-OF-THE-ART REPORT

Duesseldorf HANDELSBLATT in German 18 Jun 80 pp 105-106

[Article by Hans-Jurgen Warnecke: "Automating With Robots--No Success Without Exact Planning of Peripherals"]

> [Excerpt] Industrial robots, advertised for a long time as a technical revolution and used for over 10 years in various areas of manufacturing, are only slowly propagating. Information from experienced users, increasing labor costs, increasing efforts to make work more humane, mature equipment and increased research and development will cause a considerably greater number to be used in the future.

Industrial robots are mechanical handling devices designed for industrial use which can be freely programed about several axes and equipped with grippers or tools. They differ from the frequently used feeder devices in their programmability and more elaborate kinematics. In addition to the three principal axes, industrial robots usually possess one or several secondary axes which are used for orienting the grippers or tools.

Automating is transferring physical, recognition and decision functions from man to machines. Handling of components and tools in manufacturing exhibits a very low degree of automation, especially in low and medium volume production. In the beginning of industrial robot technology, the industrial robot was viewed as a potential for closing this gap since, based on its programmability, the desired flexibility appeared at hand. The industrial robot was seen as a "gap filler" between man and special purpose machines. That this expectation was not fulfilled is certainly to be found in the fact that even though the industrial robot did meet the demand for flexibility, the peripherals like orientation controls and sensors did not possess the necessary flexibility.

Lately, the industrial robot is finding increased application in mass production, not so much in handling but in processing tasks such as spot

welding. Here, there is an opportunity to use instead of expensive special designs more reasonably priced standard building blocks which can be reused after a product change. The number of such units used in this area is expected to experience strong growth.

In 1974 only about 130 industrial robots were in use in the FRG, but the number has grown to about 800 since that time. In comparison to international figures, these numbers are modest. In Sweden alone over 800 are in use and the growth rate in the United States is calculated at about 150 units per month.

The main customer for industrial robots in the FRG--as in Sweden, Japan and the United States--is the automobile industry. Presently every fourth industrial robot in the FRG is to be found in this industry--the trend is upward. A comparison with Japan shows that there, for the same level of automobile production, three times the number of industrial robots is used.

In the FRG industrial robots have been introduced on a greater scale in electrical manufacturing companies and, what may be surprising, in factories which make ceramic products. The last example shows that it does not necessarily require the potential of big business to get involved with this type of automation. Presently, about every 9th industrial robot resides in a business with fewer than 500 employees, where it is used predominantly for coating and handling presses and pressure molding machines.

Thus, three work tasks have already been listed which could be taken over today by industrial robots. Generally stated, on the one hand it involves the handling of tools and on the other the handling of components plus assembly.

In the case of tool handling, the task of the industrial robot consists of manipulating tools like spray pistols, spot welding guns, milling machines and drills which are attached to the industrial robot located at a station where a process like painting, spot welding, arc welding or deburring will be carried out.

In particular, painting (the application of lacquer, protective undercoats, enamel, etc) and spot welding are listed among the classic applications in tool handling and no longer conceal unexpected risks for the user.

For path welding, path controlled industrial robots are required which in general must exhibit a higher accuracy than industrial robots used for painting. Problems arise primarily through the deviation of the weld seam from the programed path, necessitating rework to improve the quality of parts.

In most of today's applications of industrial robots for deburring or cleaning of castings, the burr or flashing material is removed by precision grinding along a programed path. Position tolerances and tool wear can be compensated by elastically mounting the tool. Characteristically, this results in simpler construction of the overall system and obviates sensors.

To achieve better results in this area of industrial application, force and moment sensors, minicomputers for sensor signal processing and process control and appropriate control strategies are prime requirements. With inclusion of these equipment items, it will be possible to treat each burr or surface protuberance individually using adaptive control.

In component handling, the task of the industrial robot is to pick up with its gripper a component at one location and to lay it down at another, preserving or changing its spatial orientation in the process.

The high frequency of application of industrial robots in pressure and injection molding is due to the relatively low cost of peripherals. The robot is used only for removal of components from a machine and perhaps for moving them to another work station such as deburring or cooling.

Until now the number of industrial robots used for loading and unloading machine tools has remained small. The main reason for this is the multiplicity of ancillary functions which have to be carried out in addition to the handling function. These include queuing, control and support functions. In this area the method "part out of crate into crate" is still widespread, necessitating a new order at each work station. This can be decisively changed, however, by new thinking and developing magazines and integrated loading devices for machine tools.

In fabrication where both tools and parts are handled, industrial robots are little used even today. This is due primarily to the great complexity of the associated tasks. Extremely high demands are placed on positioning accuracy, especially in carrying out assembly tasks, and this can usually be accomplished only via controls employing sensors. Since in an assembly process different parts and tools have to be handled, great flexibility is required which must be achieved by a gripper change system or flexible grippers and by flexible part positioning. For more complex assembly tasks it would sometimes be necessary to synchronize the movement of several arms.

In order to probe the potentials of future programmable assembly systems and to be able to develop the required components, an assembly robot may have to be modified and provided with additional equipment. At the center of such research work is the Fraunhofer Institute for Production Engineering and Automation (IPA) at Stuttgart, which is studying the assembly problem using tactile sensors and visual surveillance of the assembly process.

As reasons for the application of industrial robots, users list economic, technical and social factors (in that order!). As amortization time for highly developed equipment in two-shift operation, 1.2 to 2.2 years is mentioned in Europe. The market trend toward greater product variety and decreasing lot sizes requires flexible, automated production with capital-intensive tooling which, of necessity, must be operated two or three shifts. Specifically in shift operation the pressure for automation is especially high since not enough workers can be found for shift operation, and the combination of shift work and timed tasks is recognized as detrimental by work scientists.

Releasing man from monotonous work, decreasing the strain placed on personnel, for example, by heat, dust, solvent fumes, etc and laws and regulations relating to job safety are increasingly named as reasons for the application of industrial robots.

To guarantee that all viewpoints concerned are taken into account in applying industrial robots, a systematic procedure for use planning was developed at IPA.

In any case a broader application of industrial robots is to be expected in the future. On the one hand additional fields of application will be opened up in industries which until now have hardly used industrial robots; on the other, the systems in industrial branches where they are already successfully applied will be improved.

The development of tooling and products suitable for automation will be the prerequisite for economical application of industrial robots. Modular handling systems which can be adapted for a range of applications as well as single purpose devices, such as painting and welding robots, will be available at a lower cost than today's still much too expensive universal devices.

The further development of sensor technology and adaptive controls for industrial robots which are capable of processing sensor signals will make possible new applications and increase the flexibility of present applications.

Further, if one takes into account social aspects like the potential for improving working conditions, then it is certain that industrial robots will be applied as routinely in manufacturing in the 1980's as, for example, NC machine tools are today.

Also, the highly developed industrial robot technology will in the future play a significant role as an article of export. The present technological lead of the United States and Japan over Europe in industrial applications will soon be nullified.

Key:

1. Relative frequency
2. Casting
3. Spot welding
4. Path welding
5. Deburring
6. Miscellaneous
7. Presses
8. Forging machines
9. Pressure welding machines
10. Injection welding machines
11. Miscellaneous
12. Assembly
13. Research purposes
14. Unspecified uses
15. Tool handling
16. Parts handling
17. Industrial robots in the FRG
18. Source: IPA
19. 100% = 649 units
20. Status: August 1979

9160
CSO: 3102

INJECTION METALLURGY YIELDS CHEAPER, BETTER STEEL

Development of Process

Stockholm NY TEKNIK in Swedish 7 Aug 80 p 6

[Article by Carl Daniel Norenberg]

[Text] Injection metallurgy is a fine example of Swedish science and technology of international quality. Injection metallurgy yields cheaper and better steel. Sweden is well ahead in knowledge and process techniques. But other countries, mainly Japan and West Germany, are closing in fast. This was noted at the conference, Scaninject II, arranged by Mefos, the Metallurgy Research Station in Lulea.

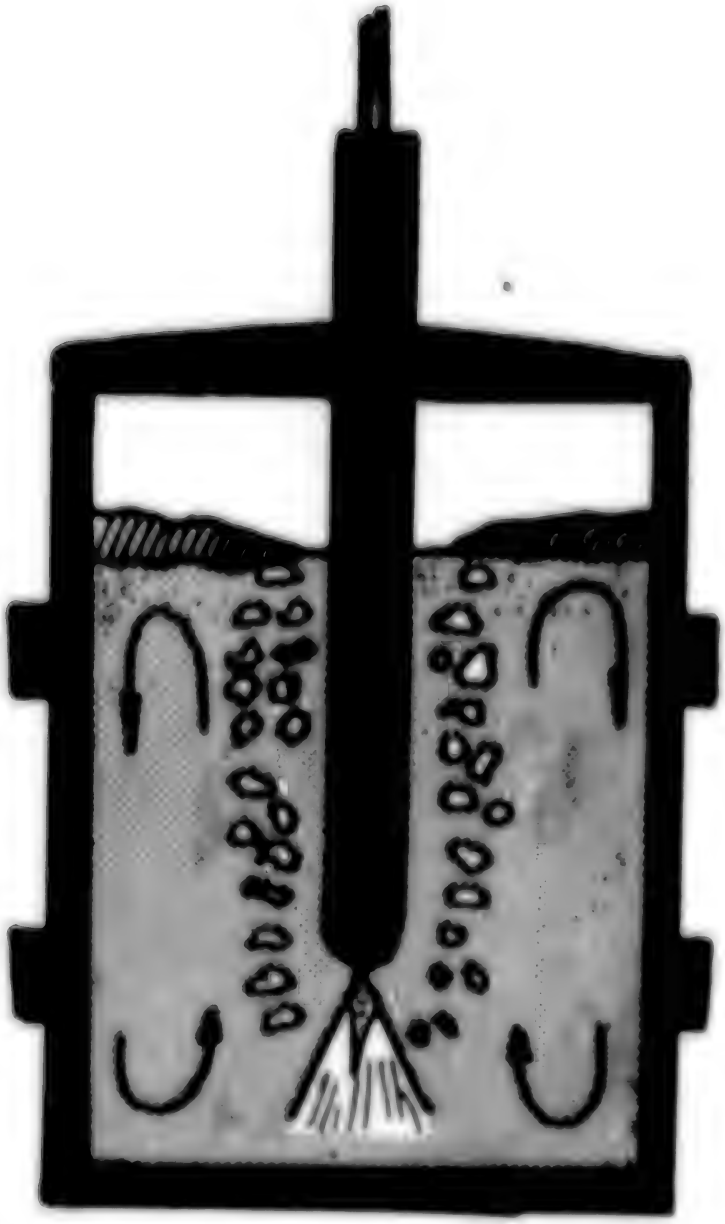
"Sweden has no special market advantages such as cheap energy or iron ore," said Bertil Berg, Mefos executive director and one of the chairmen of the Scaninject II conference.

"Compared to Mexico, for example, with its free gas the Swedish steel industry must concentrate on high refinement and new processes. Kired, Inred and SKF [Swedish Ballbearing Works] plasma are examples of methods of producing crude iron that show how advanced Sweden is. But we lack vigorous investment programs."

The injection process, which Mefos helped develop, is an excellent example of Swedish technology and expertise which is now being exported.

Mefos is currently working on reducing the phosphorus content of LKAB Mining Company ore with the help of the injection process.

"We got rid of the sulfur and now the hunt is on to eliminate the phosphorus," said Bertil Berg.



The principle of the injection technique is that one blows in a powder mixture through a ceramic-insulated lance which is dipped below the surface of the liquid in the ladle.

Smelting Apparatus

The new aspect is that the steel process can now be divided up into at least two stages with the help of the injection technique. The furnace is now used only as a smelting apparatus. Further processing has been shifted to the casting stage. The furnace is better utilized when it acts solely as a smelting apparatus and the steel process is more exact with injection metallurgy, which yields steel of a higher quality. It is also much easier to reproduce results, meaning that there is less waste.

In the past, arc furnaces were used in the conventional steel process to smelt and then further process steel. Cooling, the removal of carbon, deoxidation, dephosphorization and alloying are examples of processes carried out in the furnace. A number of substances had to be incorporated in the smelting process when the furnace was tapped. This produced uneven analyses, took time and led to quite a bit of waste.

Initial Project

Injection metallurgy began with an initial trial project at Mefos in the early 1970's. By 1975 they had made enough progress for a pilot plant to be installed at Degerfors Works. The development cost, 6 million kronor, was regarded as very modest in the context. Test facilities were also located in other Nordic steel plants. At these facilities the powder was led through a flexible pipe to a ceramic-insulated lance. The lance was maneuvered by a regular overhead crane or fork lift. Despite the very simple equipment the results were so good that Mefos had a hard time getting its test dispensers back. Several steel plants quickly built their own equipment. This pointed to the need for a uniform production apparatus. Kockums Construction in cooperation with Uddeholm began to develop such a system under an agreement with Mefos. A firm called Scandinavian Lancers was formed at the same time. Today this firm has delivered about 40 sets of equipment in competition with West German, English and Japanese firms, among others. ASEA [Swedish General Electric Corporation] also has an injection process which is used by Kawasaki Steel, among others.

Degerfors First

Nyby-Uddeholm in Degerfors was one of the first steel plants to use the injection method. Degerfors produces special steel for such things as pipes and tools. "We were looking for new methods to make our steel production more efficient," engineer Harry Berthausen of Degerfors Works said.

"Our pilot plant started up in 1975 and a full-scale facility from a Scandinavian Lancers design was ready in 1976.

"With this process we have had a time savings of 20 percent, representing about 1 hour every time the furnace is tapped. We can also operate the furnace at full efficiency. The quality of the steel has increased and we have hardly any scrap that has to be remelted."

A new rustfree steel, Prodec, has been developed with the injection technique. Prodec is considered to give the user twice as good processing results as similar conventional steel.

"The injection process has led to Degerfors Works still being in existence today," Harry Berthaussen said.

Steel Quality

Stockholm NY TEKNIK in Swedish 7 Aug 80 p 6

[Text] Today the injection technique is used in steel manufacturing to remove sulfur and phosphorus as well as in alloying.

Through a ceramic-insulated lance which is dipped below the surface of the liquid in the ladle a powder mixture is blown in. The composition of the powder can be calcium silicon, lime or magnesium alloys, for example. These substances drastically reduce the sulfur content. The Japanese have shown that it is possible to go down from 0.025 to less than 0.001 percent by volume of sulfur in production. The stirring effect of the lance provides a very homogeneous mixture and thus more even analyses.

With injection it has also been possible to change the form of the small oxide particles that are found in steel. This improves the mechanical properties of the steel such as strength and flexibility. It is now also possible to strip cast certain qualities containing aluminum, something that used to be almost impossible. Through calcium injection the hard aluminum particles are replaced by small deformable oxides. This greatly improves the processing qualities of the steel resulting in lower tool costs.

Job Environment

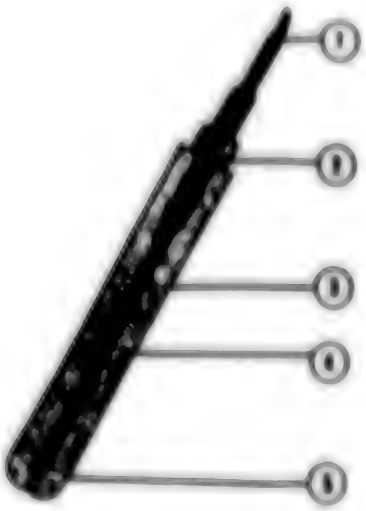
The addition of the pulverized substances occurs far beneath the surface of the molten metal. This is utilized in many steel plants since one can get a high yield even with volatile substances. This also greatly improves the job environment.

A future development of the injection process will be in the area of conveying heat to the ladle through plasma or electrodes, for example. One of the big disadvantages of the injection technique is that the

temperature goes down during the process. At present this means the furnace has to be overheated, leading to wear on the furnaces and ladles. The heat loss increases the smaller the ladle is, giving less time for the injection process. A heating system of some kind would guarantee that the steel would always be at the right temperature and that the ladle could be used as an intermediate heater.

Vacuum Technique

Another development is to produce an "airtight" system with the help of the vacuum technique. Then, the scientists believe, it would be possible to do almost anything to the steel. They also expect more computerization and automation in connection with the injection process.



This shows a lance for injecting powder in cross section.

Key:

1. Injection tube
2. Compensatory system for changes in length due to heating
3. Ceramic insulation
4. Dissolvable cover
5. Horizontal and vertical injection tubes for gas and powder

6578
CSO: 3107

BRIEFS

INDUSTRY MOST AUTOMATED IN WORLD--According to statements by Swedish Minister of Industry Nils G. Asling, there are more computerized production units in operation in Swedish industry than in any other country on this earth. This applies both to controlled machine tools and to industrial robots. Presently in Sweden, more than 1,000 industrial robots are in operation. In order to indicate a similar density, about 3,000 to 4,000 such devices would have to be used comparably in the United States or Japan. In the opinion of the minister, computers and robots will have to be used even more if Sweden's industry wants to maintain its competitive position and its employment rate. The development, however, must be feasibly adapted to the human requirements. Too rapid change could result in negative reactions and feelings of alientation. For this reason it is important that the use of computers in industry by controlled so that employees and trade unions can influence the course of events. Above all, improved training tailored to the use of computers is a present need. [Text] [Bern TECHNISCHE RUNDSCHAU in German 24 Jun 80 p 10] 9527

CSO: 3102

SCIENCE POLICY

SWEDISH LEAD IN POWDER METALLURGY THREATENED

Stockholm NY TEKNIK in Swedish 12 Jun 80 p 8

[Article by Anders Wallerius: "Powder Metallurgy Analysis: We Are Behind"]

> [Text] Sweden continues to lose the lead in the field of powder metallurgy. If we don't concentrate quickly on basic research, the world leading Swedish industry will be left behind by foreign competitors.

Progress is rapidly being made all over the world. Before long the United States, Japan and the EC-countries will be strong competitors in the world leading Swedish industry.

The analysis for the future of powder metallurgy was made by Olle Grinder, Institute for Metal Research, commissioned by STU. Grinder points out the great need for continued research in order to retain the Swedish lead. This is especially applicable to basic research. Production development can be handled by the profit making companies themselves.

--Powder metallurgy is one way the Swedish special steel industry can avoid poor profitability, says Grinder.

This is also the field Grinder wants to save.

Cinder Steel

Half of all iron-and steel powder used in the world comes from Hoganas, Inc., and its American jointly owned company. Furthermore, the company markets know-how to those who manufacture the ready made cinder-forged parts.

Cinder steel will become more profitable with the increased energy cost, the analysis showed. High level of materail inter changing (90-95 percent), lower weight and little follow up work will lead to the replacement, to a certain extent, of traditional forging and moulding.

The future will bring better material quality and new methods of atomizing (decomposing of the metal). Here, however, further research is needed.

Hard Metal

In the field of hard metal, Sandvik, Inc., is far ahead. One-tenth of the world's market is provided by the Swedish industyr.

During the 1980's a powerful development in both material and tools will take place. This applies to the hard metal, but above all to techniques in over-casting of cutting tools.

An important task is finding replacements for the increasingly rare alloys. Further research is needed in this field.

--Much will be happening in the field of semi-manufacturing, says Grinder. But then someone must risk investments in it.

The ASP-process is used by the Uddeholm in Soderfors. They manufacture high quality high-speed steel.

Uddeholm has another company in Hyby which deals in semi-manufacturing. There they apply a new method in manufacturing rust-free pipes. This method requires spraying the powder through a matrix into finished pipes.

The STAMP-process, also quite new, makes it economically possible to manufacture steel of lesser quality by applying the powder technique. The Surhammers Bruk will this fall start applying this new method in producing special steel.

Manufacturers of the machines needed forthe complicated processes are also to be found within the country.

Thus Sweden has access to both technique and know-how.

9538
CSO: 3102

REPORT ISSUED ON DEVELOPMENT OF INDUSTRIAL RESEARCH

Paris LE PROGRES TECHNIQUE in French No 13, 1980 p 10

[Article by Martine Fontoin: "A New Report On the Development of Industrial Research*"]

[Text] The mission entrusted to the group headed by Mr Roger Fauroux was to study the measures likely, at middle term, to increase the research efforts of French industry to put her on a level with its large foreign competitors. In fact, 1.8 percent of the GNP are devoted to research and development in France, as compared to 2.3 percent in the USA and 2.2 percent in Germany.

For France to remain competitive, it needs a significant increase in the financial means available for research and development but also a qualitative improvement of existing research facilities.

These are the group's recommendations:

Financial Measures

To reach a ratio of 2.2 percent of the GNP in 1985, France's domestic expenses for research and development should rise to 68 billion francs by that time. This corresponds to an increase in volume, over five years, of 20 billion francs--of which 7 billion would only maintain the current ratio of 1.8 percent--that is an increase of 40 percent in research and development activities.

Since the state's share, already quite significant, cannot exceed certain limits imposed by the government's wish not to increase fiscal pressure, it will fall on business to assure the greatest part of the financial

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* This report on "the prospects and methods for the development of industrial research" is issued by a group formed at the request of the minister of industry and the secretary of state for research and headed by Mr Roger Fauroux, president-director general of Saint-Gobain Pont-a-Mousson.

effort. The hypothesis foresees an industrial contribution of 10 billion francs, that is an increase of almost 65 percent of its research and development activities in five years. Thus, the private sector would finance 48 percent of R & D in 1985 instead of the current 42 percent.

In the present economic context, some incitement from the state is imperative to encourage businesses on this way. Thus, it is essential to create a new non-coercive, highly encouraging, neutral (neither selective nor sectorialised) public aid measure, one having strongly multiplying effects. The group's choice has been a measure of fiscal exemption whose principle is: "to authorize businesses to deduct from the profit subject to corporate taxes an amount equal to one-half of the increase in R & D expenses in constant francs, with reference to the previous fiscal year." Due to the difficulties in applying this measure, the amount of R & D expenses to be considered could be limited, initially, to the cost of research personnel (researchers and assistants), to the annuity of amortization of R & D investments and to the research contracts subcontracted by the company. To make this measure even more motivating, there has been a proposal to authorize those companies who sustain their efforts to profit from this deduction for two consecutive years.

In addition to this automatic and neutral measure it would be necessary for the state to strengthen its so-called "finalisees" aids which allow it to favor certain projects of national interest. Traditional industries should be called on to benefit from these aids more extensively than in the past. Finally, it is suggested that these aids be cumulative with the fiscal exemption measure mentioned before. This strengthening demands doubling overall budget means involving aid to innovation and to contracts of programs managed with research funds. The annual cost of this proposal would be some 900 million francs.

Improvement of Existing Research Facilities

The group proposes a certain number of qualitative measures likely to increase the efficiency of the French R & D system, without supplementary expenses:

--It is necessary to carry on the regionalization effort already undertaken (ANVAR, ARIST, [expansion unknown]...). Following MIT's example, it is suggested that the CNRS [National Center for Scientific Research] offer information and service packages to enterprises, for a fee.

--Subcontracting in research matters should be encouraged by measures such as the subsidy for innovation managed by ANVAR. In this same spirit, special attention must be given to collective research which plays a fundamental role in the transfer of technologies. Technical centers must be made more aggressive by pacing them in increased competitive conditions. Current financing, by branches, is not in tune with the idea of interdisciplinary research; partial financing could be considered. Always aiming at developing competition, contributing companies should be authorized to

allocate a part of the parafiscal tax that they contribute to their technical center, to an agreed-upon center of their choice. The implementation of these new dispositions would be progressive, of course.

--Mobility of researchers is equally important to the transfer of knowledge; it could be encouraged, for example, by accepting company training courses as part of the researcher's career.

Creation of New Mechanisms

A better integration of research into the economy requires:

--Establishing closer cooperation ties between public and private laboratories by creating "shift structures," associations, GIE [Economic Interest Groups] and, also, by strengthening the educational system: training programs in public laboratories and courses in research for engineers;

--Trying to minimize the risk in the development of innovation by having capital-risk companies share in the capital, but especially by a psychological incitement such as guaranteeing a market for the new products.

9341
CSO: 3102

SCIENCE POLICY

FRANCE, SWEDEN TO COOPERATE IN SCIENTIFIC, TECHNICAL AREAS

Paris AFP SCIENCES in French 19 Jun 80 pp 1-3

[Text] Paris--Toward a greater scientific and technical cooperation between France and Sweden--France and Sweden will intensify their scientific, technical and industrial cooperation in a number of new fields such as microelectronics, space, new energy sources and biotechnology. Such are the conclusions emerging from the French-Swedish Industrial Colloquium which was opened on 16 June by the King of Sweden, in the presence of Mr Andre Giraud, minister of industry, and closed on the 17th by Mr Pierre Aigrain, secretary of state for research. These conclusions agree with the spirit of the King of Sweden's and Prime Minister Raymond Barre's statements at the lunch given Tuesday by the government in honor of the Swedish sovereigns.

"Our collaboration in space also deserves special mention," the King of Sweden stressed, and Mr Raymond Barre indicated that "greater cooperation can still be developed in the future between our researchers and engineers, especially in the field of space."

In this field, as Mr Aigrain pointed out at the colloquium, "a Swedish company is already taking part in the ARIANE project, which should launch the Swedish satellite VIKING (in 1984, at the same time that the French surveillance satellite SPOT) and interesting prospects could develop around the Scandinavian project NORDJAT (Telecommunications satellite of the Nordic countries).

Mr J. Stiernstedt, president of the Swedish Delegation of Space Activities, revealed that "the two countries are studying the possibility of having Swedish industry participate in the implementation of the French part of the French-German direct boradcast satellite and, in turn, French industry would take part in the implementation of the "TELE X", the Swedish experimental telecommunications satellite. French and Swedish specialists should start meeting in the coming weeks to discuss this matter. Sweden is also taking part in the French program SPOT and it agrees with France's position at the ESA concerning the development of a European apogee motor (for launching satellites on earth-synchronous orbits).

In the field of microelectronics, the two countries will initiate the study of "CAYAC," a pilot project in office automation (electronics associated to office work). In biotechnologies, a certain number of joint actions are being studied and arrangements to carry them out are under consideration.

Finally, perspectives for cooperation between the two countries are emerging in the fields of bioenergy, geothermal energy, energy conservation, energy storage and nuclear safety.

The AFSR [French-Swedish Research Associaton], organizer of the colloquium, was formed in 1967. Its basic operating budget is 0.5 million francs, and comes from equally distributed public subsidies as well as contributions from industrial and individual members.

The AFSR's board of directors is formed by:

President:

--Bengt Petri (president of the Swedish Council of Medical Research, MFR).

Vice presidents:

--Jean Claude Wanner (technical and industrial research advisor at the DGRST [General Delegation for Scientific and Technical Research]),

--Harry Brynielsson (Royal Academy of Engineering Sciences, IVA).

French Section:

--Albert Brousse (ANRT [National Association for Technical Research] general manager),

--Jacques Ducuing (CNRS [National Center for Scientific Research] director general),

--Claude Dugas (director of science at the Thomson-CSF Company),

--Philippe Laudat (INRA director general),

--Henri Piatier (COGEMA advisor),

--Jacques Poly (INRA director general),

--Jean-Bernard Raimond (director general of cultural, scientific and technical relations at the ministry of foreign affairs).

Swedish section:

--Bertil Aronsson (director of science at the Sandvik Coromant Company),

--Jan-Olof Carlsson (assistant director general of the National Directorate of Technical Development - STU),

--Henry Danielsson (secretary general of the NFR),

---Olle Johansson (secretary of the Royal Academy of Agriculture and Forestry KSLA),

--Ingvar Lindqvist (secretary general of the Swedish Council of Research in Basic Sciences - NFR),

--Arnee Magnell (Royal Academy of Sciences KVA).

Secretary general:

--Denis Lallouche (assistant science advisor at the French Embassy in Stockholm).

9341
CSO: 3102

RESEARCH MINISTER HAUFF'S NEW R&D AID PROPOSAL DESCRIBED

Duesseldorf WIRTSCHAFTSWOCHE in German 16 Jul 80 pp 14, 16

[Article: "Minister on the Third Path"]

[Text] Minister for Research Volker Hauff wants to assist small and medium-sized companies with indirect, but specific support. At the same time he would like to take the wind out of his critics' sails.

Minister of Economics Otto Graf Lambsdorff risked a quarrel with fellow cabinet member Volker Hauff. In front of FDP friends he warned: "Anyone who thinks he can, by predetermination and selective support of specific economic branches which are ostensibly promising for the future, achieve the future-oriented adaptation of our economy to the altered national and international basic economic conditions, is on the wrong track."

Not the state, but rather the companies would have to master the structural change. "The state cannot and must not relieve them of this task, not even by structural control in the guise of direct support for research and development."

The Social Democrat research minister accepts the reproaches calmly: "As long as I receive no more blows, I can easily endure that." The demand raised by many critics to give up completely the direct, project-related subsidizing of research and development measures (R&D) completely misses the main point as far as Hauff is concerned: "Direct, program-oriented support is indispensable wherever only the technical program/project mechanism makes it possible to reach the point where the R&D activities of the economy also contribute to realizing important national or general economic objectives." This means: In the energy sector or in space technology, in aviation or in transportation with their billion-mark programs, research without state support would in Hauff's view not be possible on the scope that is required for national reasons.

Indirect support measures, on the other hand, according to Hauff, are "primarily meaningful only if small and medium-sized companies are given priority consideration."

This year the federal government will distribute to small and medium-sized companies approximately DM 620 million via personnel cost subsidies, the carry-over research allowance and Article 4 of the Investment Credits Law.

In view of the DM 2.3 billion which are to be paid this year as direct research subsidies, the indirect share in R&D payments is too small for many of Hauff's critics. However, Minister of Economics Lambsdorff--who considers direct state support in the research sector to be appropriate where "a proven specific overall economic need exists," or where risks and costs are so great that they overtax the financial power of a company--considers "a more balanced role distribution between direct and indirect research and development support to be necessary."

This could happen soon; for in the "workshop" (Hauff) of the Ministry for Research, work is in progress on a new support program. "Indirect-specific" is the magic word with which Hauff intends to take the wind out of his critics' sails. With the "third path" (Lambsdorff), the research minister predetermines the research sector which is to be supported (example: measures to save energy in the framework of nonnuclear energy research) as well as the total available sum.

In the framework of a greyhound race, interested companies could continue to apply for subsidies until the funds are exhausted. Whoever is too late is out of luck.

However, not all research sectors are suited for indirect-specific support. Among other things, there must be the prerequisite that the technological basic knowledge in this area is extensively developed. Then, as a rule, the financial outlay for the individual project is no longer very great, and the risk of the individual project can be clearly seen by all.

Minister Hauff, moreover, intends to use the new support instrument only if the number of possible cases for support tends to become large and the applicants are primarily from the sector of small and medium-sized companies. Thus, he would also like to equalize the "structurally related disadvantages" of these companies, which "frequently shy away from cooperation with the BMFT [Ministry for Research and Technology] because of the necessary verification costs associated with direct support."

The new instrument makes this easier; the only check made is whether the proposed project fits into the program; there is no opinion from outside experts. An additional advantage of the program is that several parallel projects of various companies can be supported.

In the context of brainstorming, the research strategists of the Hauff ministry have screened the possible research sectors. Of 12 areas originally open to selection, 4 were left:

Development of energy-optimized products and production processes;

Recycling of household garbage and residues from industrial production;

Development of new kinds of materials and material-processing methods;

Use of microelectronics.

The minister dampens excessive expectations however: "The deliberations on where indirect-specific support can be used have not yet been concluded."

He also resists accepting microelectronics into the catalog, "for it is here that the most massive effects on jobs can be expected."

Hauff can count on the benevolent testing of his ideas by his present critics. President of the Association of German Machine-Building Establishments (VDMA) Bernhard Rapp, who recently put the research minister under heavy fire for tying the trade unions into the research program for manufacturing technology, of course still has reservations, but he does confess: "In principle this is headed in the right direction."

12124
CSO: 3102

FIRST BAE 146 FEEDERLINER TO BE DELIVERED IN 1982

Gelsenkirchen AEROKURIER in German Jul 80 p 810

[Text] Following prolonged efforts British Aerospace announced at the beginning of June the first sale of its four-engined Feederliner BAe 146. The Argentinian airline LAPA (Lineas Aereas Privadas Argentinas) was the first to decide in favor of the new British airliner. LAPA ordered 2 BAe 146 100 series for 86 passengers and 1 BAe 146-200 with a maximum capacity of 104 passengers, which will be delivered in October 1982 and March 1983 respectively. At the same time LAPA took out options on 3 additional BAe 146-200's.

British Aerospace is setting the maiden flight of the 146 for early next year. Although the four-engine layout of the 146 is unusual for a feeder airplane, the manufacturer claims excellent economy in the "almost 100-seat class" and low environmental pollution levels.

An unusual concept: the 146 designed by British Aerospace for short and medium range traffic is powered by 4 Avco Lycoming ALF 502-R-3 engines, each developing 28.8 kN (3,027 kiloponds) thrust; the airplane, built in 86 and 104-seat versions, has a maximum speed of 791 km/hour at a height

of 6,600 meters. Maximum range is just under 2,750 km. The drawing on the preceding page shows the BAe 146 in the colors of the first customer, the Argentinian airline LAPA. Below: Arrival of the first forward and center fuselage sections of the 146 at the BAe factory at Hatfield, where final assembly of the prototype will soon begin.

9581
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MERCEDES WORKS ON ALTERNATIVES TO GASOLINE CARS

Stockholm SVENSKA DAGBLADET in Swedish 25 Jul 80 p 13

[Text] West Germany has been concentrating heavily on alternatives to gasoline and other petroleum products. The Ministry for Research and Technology has begun an "Alternative Sources of Energy for Traffic on Streets and Highways" research program.

Mercedes is one of the West German automobile manufacturers which is participating, with more than a 100 passenger and commercial motor vehicles, in all four areas reported by the Ministry for Research and Technology: alcohol fuels, hydrogen technology, electric power and hybrid technologies.

Alcohol the Most Interesting

Alcohol holds first place among the various alternatives. Mercedes Benz runs test vehicles with the M 15 mixture (i.e., 15 percent methanol and 85 percent gasoline as an initial step in the conversion), pure methanol (such as can be produced by the gasification of coal, for instance) and pure ethyl alcohol (which can be removed from biomass--Brazil is already doing so from sugar cane on a large scale).

Hybrid Bus: No Exhaust Gas in the City

OE 305 is the designation of the Mercedes hybrid bus which runs with no exhaust gas in the inner city, but which produces the required electric current when operating in the suburbs by means of a diesel generator.

Another solution of the problem is the duo bus, of which Mercedes is producing two variants.

Both variants can be driven entirely electrically with current from an overhead line.

In stretches where there is no overhead line, one variant takes current for its electrical operating motor from the batteries it carries, while in the case of the other type the vehicle is driven by a diesel engine with an automatic transmission.

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